



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/749,946	12/29/2000	Abel C. Dasyva	57983.000018	6810

7590 07/22/2004  
Thomas E. Anderson  
Hunton & Williams  
1900 K Street, N.W.  
Washington, DC 20006-1109

EXAMINER

BELLO, AGUSTIN

ART UNIT	PAPER NUMBER
----------	--------------

2633

DATE MAILED: 07/22/2004

10

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/749,946

Applicant(s)

DASYLVA ET AL.

Examiner

Agustin Bello

Art Unit

2633

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 10 May 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 9-13 is/are rejected.
- 7) ☒ Claim(s) 6-8 and 14-16 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 2, 9, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Doerr (U.S. Patent No. 6,532,090).

Regarding claims 1 and 9, Doerr teaches a method for interchanging wavelengths in a multiwavelength system having W wavelength channels, the method comprising the steps of: selectively directing a pair of adjacent frequency channels corresponding to a respective pair of adjacent wavelength channels based upon a routing algorithm (reference numeral 910 in Figure 9); interchanging the frequencies of the selectively directed pair of adjacent frequency channels (reference numeral 930 in Figure 9); and selectively shifting the interchanged frequencies of the selectively directed pair of adjacent frequency channels (reference numeral 206 in Figure 2 and column 4 lines 24-32, column 6 lines 20-24). Doerr differs from the claimed invention in that Doerr fails to specifically teach that shifting of interchanged frequencies is based upon a binary representation of each interchanged frequency. However, frequency shifting of frequencies based upon a binary representation of the frequency is, as noted by the applicant (page 13 lines 3-6), well known in the art and is accomplished via frequency mapping methods such as the butterfly permutation. Furthermore, frequency shift keying (FSK) is a well known digital method for assigning frequencies to specific binary representations, i.e. one frequency is

Art Unit: 2633

represented by “1” while another frequency is represented by “0” with frequencies being shifted according to binary representations. As such, one skilled in the art would clearly have recognized that it would have been possible to implement either a butterfly permutation or FSK in the device of Doerr (reference numeral 206 in Figure 2) in order to shift the frequencies according to their binary representations. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to shift the interchanged frequencies based upon a binary representation of each interchanged frequency.

Regarding claim 2, Doerr teaches the step of selectively directing the pair of adjacent frequency channels comprises the step of: selectively switching the pair of adjacent frequency channels to one of two output pairs (as seen in Figure 9 at the input of wavelength interchangers reference numeral 930).

Regarding claim 10, Doerr teaches that the switching element comprises: a cross-connect (reference numeral 204 in Figure 2) for selectively switching the pair of adjacent frequency channels to one of two output pairs.

3. Claims 3-5 and 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Doerr in view of Lee (U.S. Patent No. 5,148,428).

Regarding claims 3, 5, 11, and 13, Doerr differs from the claimed invention in that Doerr fails to specifically teach routing the selectively directed pair of adjacent frequency channels based upon a binary representation of the frequency of each of the selectively directed pair of adjacent frequency channels. However, routing based upon a binary representation is well known in the art. Lee teaches a system wherein a switching element is capable of performing a binary routing algorithm based on an n-bit destination address. One skilled in the art would have

Art Unit: 2633

been motivated to rout the selectively directed pair of adjacent frequency channels based upon a binary representation of the frequency of each of the selectively directed pair of adjacent frequency channels in order to ensure that channels of a particular frequency reached their destination. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to rout the selectively directed pair of adjacent frequency channels based upon a binary representation of the frequency of each of the selectively directed pair of adjacent frequency channels.

Regarding claims 4 and 12, the combination of Doerr and Lee differs from the claimed invention in that it fails to specifically teach shifting the frequency of a first of the selectively directed pair of adjacent frequency channels by an amount defined by  $+\Delta f$ ; and shifting the frequency of a second of the selectively directed pair of adjacent frequency channels by an amount defined by  $-\Delta f$ ; wherein  $\Delta f$  is the frequency spacing between the pair of adjacent frequency channels. However, being that Doerr teaches frequency shifting in general, one skilled in the art would clearly have recognized that it would have been possible to shift the frequency of the channels by any amount desired including by  $\pm\Delta f$ . Furthermore, interchanging of frequency channels by shifting them by the frequency spacing is well known in the art. Moreover, Doerr, in teaching wavelength interchanging suggest that the frequencies of the channels are shifted in opposite directions. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to shift the frequency of a first of the selectively directed pair of adjacent frequency channels by an amount defined by  $+\Delta f$ ; and shifting the frequency of a second of the selectively directed pair of adjacent frequency channels by an

Art Unit: 2633

amount defined by  $-\Delta f$ ; wherein  $\Delta f$  is the frequency spacing between the pair of adjacent frequency channels.

***Allowable Subject Matter***

4. Claims 6-8 and 14-16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Response to Arguments***

5. Applicant's arguments filed 5/10/04 have been fully considered but they are not persuasive. The applicant contends that the present application does not support a teaching that frequency shifting of frequencies based upon binary representation of the frequency is well known in the art. However, the examiner disagrees. On page 13 lines 2-6 of the specification the applicant states:

*"Usual connection patterns, such as shuffles or butterfly permutations, have interesting arithmetic properties that are exploited in accordance with the present invention to reduce converter cost."*

From the above statement, it is clear to the examiner that usual and therefore well-known connection patterns, such as shuffles or butterfly permutations, have interesting arithmetic properties that are exploited by, but certainly not invented or created by the applicant in the present invention. As such, the examiner maintains that the frequency shifting of frequencies based upon binary representation of the frequency is well known in the art in that the intrinsic arithmetic properties of the usual connection patterns are used to create the frequency shifts.

Art Unit: 2633

Next, the applicant argues that FSK is inapplicable to claimed invention as both claim 1 and 9 recite shifting frequencies based upon a binary representation of each interchanged frequency, and not upon a frequency representing binary ones or binary zeros. However, it is not clear where the applicant's assertion of "not upon a frequency representing binary ones or binary zeros" fits into this argument since the examiner does not rely on this feature. Instead, the examiner has relied upon the definition of FSK, which is to shift between two frequencies based upon a binary representation (1's and 0's) of a signal. The applicant's claim requires the shifting of the interchanged frequencies based upon the binary representation of each interchanged frequency (e.g. shifting based on the 1's and 0's that make up an interchanged frequency). As stated in the office action, one well known method of shifting a frequency is to do so based on the binary representation of the signal, better known as frequency shift keying.

With respect to the applicant's assertion that Doerr does not teach selectively directing a pair of adjacent frequency channels corresponding to a respective pair of adjacent wavelength channels based upon a routing algorithm, the examiner disagrees. For example,  $\lambda_1$  in channel 1 is adjacent to  $\lambda_2$  in channel 2 and OADMs of 910 in Figure 9 work to direct this pair of adjacent frequency channels corresponding to a respective pair of adjacent wavelength channels based upon a routing algorithm. What routing algorithm Doerr follows is indeterminate, but the fact remains that a step-by-step routing procedure, and hence a routing algorithm is followed in directing this pair of adjacent frequency channels corresponding to a respective pair of adjacent wavelength channels. Furthermore, the applicant's claim fails to specify the steps of the routing algorithm that would differentiate it from the routing algorithm taught by Doerr. Therefore, it is

Art Unit: 2633

clear that Doerr meets the limitations of the claimed invention given the broadest reasonable interpretation of the terms "routing algorithm."

Next, the applicant argues that the wavelength interchanger of Doerr (reference numeral 930 in Figure 9) fails to interchange the frequencies of the selectively directed pair of adjacent frequencies. However, as discussed above, a pair of wavelengths and their corresponding frequencies are selectively directed to the wavelength interchanger of Doerr and the wavelength interchanger works to interchange the pair of wavelengths and their corresponding frequencies. Likewise, the interchanged frequencies are selectively shifted by wavelength adapters 206 in Figure 2 of Doerr in that the wavelengths, even if part of larger multiplexed signal, are selectively shifted. Clearly, the possibility for  $\lambda_1$  in channel 1 adjacent to  $\lambda_2$  in channel 2 to propagate through the elements as claimed by the applicant exists. Accordingly, the limitations of the claim have been met.

In response to the applicant's assertion that Doerr does not meet the limitations of claim 2, the examiner urges the applicant to carefully review the rejection of claim 2 for a better understanding how the examiner relies on Doerr to meet the limitations. In contrast to the applicant's response, the examiner does not rely on 930 in Figure 9 to meet the limitations of the claim. Instead, the examiner points to interchanger 930 in Figure 9 to show that  $\lambda_1$  in channel 1 adjacent to  $\lambda_2$  in channel 2 could both be output from a single one of two output pairs of element 910. As such, the limitations of the claimed invention are clearly met.

Regarding the applicant's argument against the rejection of claim 10, the examiner maintains that the claim limitations are met. As discussed above, Doerr clearly teaches selective switching of a pair of adjacent frequency channels to one of two output pairs (for example,  $\lambda_1$  in



Art Unit: 2633

channel 1 is adjacent to  $\lambda_2$  in channel 2) and further teaches that the switching element comprises a cross connect 204 in Figure 2. The examiner sees no difference between the cross connect of Doerr and the cross connect claimed if the result is the same.

Regarding the applicant's arguments against the combination of Doerr and Lee, the examiner has relied on Lee merely to show that it is possible to route a signal based on the binary representation of that signal and provides motivation for routing a signal based on the binary representation of the a selectively directed pair of adjacent frequency channels taught by Doerr. Furthermore, it appears that the applicant relies on the previously addressed assertion that Doerr fails to teach shifting the frequency of a pair of adjacent frequency channels. However, as discussed above the opposite is true. As such, the examiner maintains the rejection based on the combination of Doerr and Lee.

### *Conclusion*

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Art Unit: 2633

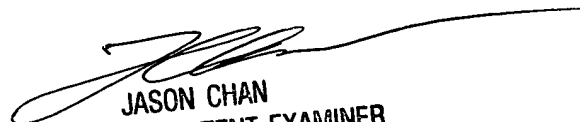
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Agustin Bello whose telephone number is (703)308-1393. The examiner can normally be reached on M-F 8:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (703)305-4729. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Agustin Bello  
Examiner  
Art Unit 2633

AB

  
JASON CHAN  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2600